



**Division of Waste Management  
Public Works  
Annual Report**

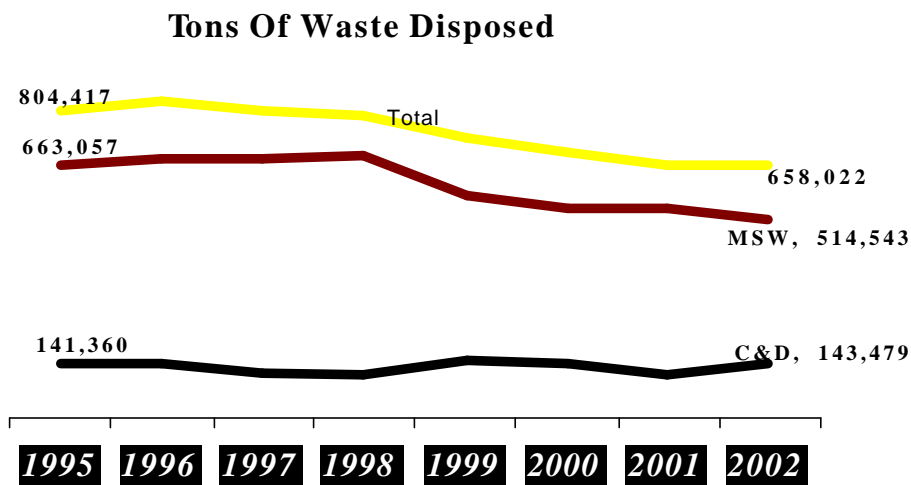
**Overview of Division of Waste Management**

- A. *Mission: Provide professional waste management to the daily operations that make Nashville clean and green in a cost efficient manner.*
- B. *The Division of Waste Management has 130 employees who, in Fiscal Year 2003, collected:*
- *2,682 dead animals,*
  - *396 tons of household hazardous waste,*
  - *19,054 tons of brush at the curb,*
  - *2,087 tons of trash from Nashville's downtown businesses,*
  - *12,209 tons of recyclables from Curby,*
  - *6,907 tons of recyclables from the drop-off sites,*
  - *processed 31,004 tons of wood waste into mulch,*
  - *turned the equivalent of 10,136 tons of methane gas extracted from our closed landfills into 10,982,987 Kilowatt - hours of electricity,*
  - *served 64,808 customers five days a week from 7a.m. to 7p.m. from its call center,*
  - *had 2,076 citizens come to the recycling convenience centers each week,*
  - *collected trash from 130,000 families every week,*
  - *collected recycling from 115,000 homes at the curb each month beginning in December 2002,*
  - *developed an environmental education program that has won 7 local awards and 4 national awards, placing it with Seattle and Pierce County, Washington as the best in the country.*
- C. *The following Report is divided into the following:*
- *Waste Stream*
  - *Education*
  - *Cost Of Programs*
  - *Nashville Transfer Thermal Corporation and the District Energy System*
  - *Contract Compliance*
  - *Environmental Compliance (authored by the Health Department)*

## ***I. The Waste Stream***

The reported Municipal Solid Waste (MSW) stream for Nashville and Davidson County continues to decline. The table below shows the decline in MSW tons.

<b>Nashville Waste Stream</b>			
<b>Year</b>	<b>C&amp;D</b>	<b>MSW</b>	<b>Total</b>
1995	141,360	663,057	<b>804,417</b>
1996	147,018	677,821	<b>824,839</b>
1997	121,659	679,362	<b>801,021</b>
1998	110,226	681,085	<b>791,311</b>
1999	153,196	579,657	<b>732,853</b>
2000	142,240	552,739	<b>694,979</b>
2001	109,987	547,438	<b>657,425</b>
2002	143,479	514,543	<b>658,022</b>



Construction and Demolition Debris (C&D)<sup>1</sup> tends to have a pattern of moving within a 30,000 ton range. MSW, however, has had a steady decline in tons since 1999.

The ratio of Nashville's residential to commercial MSW is aligned with the national average as the next table illustrates.

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<sup>1</sup> An error was found in the C&D number for 1997 and 2002. These changes have been made.

<b>Residential and Commercial Waste</b>			
<b>Waste Generator</b>	<b>2002 Tons</b>	<b>Nashville</b>	<b>National Average <sup>2</sup></b>
Residential	300,684	58%	55-65 %
Commercial	213,859	42%	35-45 %

### **Commercial Sector Recycling**

Commercial sector recycling is that which is funded by and for the benefit of the private sector. In fiscal year 2003, the Division of Waste Management (DWM) performed 102 waste audits at the request of business owners as to better understand the specific waste stream of each commercial entity. Once the particular waste stream is understood, DWM can provide information on ways to recycle, reduce and lower overall waste management costs. DWM also conducted 200 additional sessions with businesses providing them with information on recycling and waste reduction.

In addition, DWM contacted 300 businesses to ascertain the amount that was being recycled in calendar year 2002. Generators of waste, haulers of recyclables, and processors of recyclable materials were contacted and asked information regarding what, if any, recycling was being done with material generated in Davidson County during calendar year 2002.

The results of this inquiry are interesting. The commercial sector of Nashville recycled 89,604 tons of paper and old corrugated containers (cardboard); it recycled 3,752 tons of grease, mostly from area restaurants; 112,000 tons of local metal; 100 tons of electronics; nearly 11.7 tons of shrink wrap; and 20,000 tons of asphalt. The total for calendar year 2002 came to 225,467.70 tons of recyclables generated by the local commercial sector.

The recycling rate for Nashville's private sector is 51 percent: 225,467.70 tons of recyclables divided by (225,467.70 tons of recyclables + 213,859 tons of MSW), multiplied by 100.

### **Public Sector Recycling**

Public sector recycling is that which is funded by the government directly through its operations.

In calendar year 2003, the Metropolitan Government of Nashville and Davidson County recycled 69,891.17 tons. Of this material, brush amounted to 55 percent of the total. Nashville's new curbside recycling program was being phased into full service and only began to collect the total routes in December of 2002. The antifreeze, waste oil, and electronics were material collected primarily at Metro's Household Hazardous Waste Facility.

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<sup>2</sup> EPA: "Municipal Solid Waste in The United States: 2000 Facts and Figures, Generation, Source Reduction, Recycle, Disposal" pg. 11.

### Public Sector Recycling

<b>Material</b>	<b>Tons</b>	<b>Percent of Total</b>
Antifreeze	0.95	0.001%
Waste Oil	17.15	0.025%
Electronics	0.25	0.000%
Glass	1,940.44	2.776%
Mixed Metals	337.52	0.483%
Scrap Metal	1,758.04	2.515%
Aluminum Beverage Cans	41.43	0.059%
Yard Waste	38,888.44	55.641%
Asphalt	15,017.00	21.486%
Mixed Recyclables (Curbside)	5,989.98	8.570%
Newsprint	4,387.95	6.278%
Cardboard	1,079.99	1.545%
Plastic (HPDE/PET)	282.57	0.404%
Tires	149.46	0.214%
<b>Total Recycled</b>	<b>69,891.17</b>	<b>100.000%</b>

Since Metro government controls 180,681 tons of MSW, the recycling rate for the public sector is 28 percent: recycled 69,891.17 tons divided by sum of recycled plus MSW tons (69,891.17 recycled tons + 180,681 MSW tons = 250,572.17 tons).

### **Total Nashville Recycling Rate**

When the public and private tons are combined it gives the larger picture of what Nashville actually recycled in calendar year 2002. Nashville's recycling rate is 31 percent: 295,359 recycled tons divided by the sum of recycled plus disposed tons (295,359 recycled tons + 658,022 disposed tons).

### **How Does Nashville Compare With Other Cities?**

Comparing recycling rates is difficult because there is no national standard of measurement. DWM is in the process of completing a survey of the twenty-six largest cities in the nation. This survey is an attempt to quantify and define the items that are calculated into the waste stream. It is a survey in progress, however, and may continue to be refined as information from the participating jurisdictions comes forward.<sup>3</sup>

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<sup>3</sup> Baltimore's recycling number was reduced by 111,000 tons to reflect the fact that Tennessee does not count Waste-To-Energy ash as recycling.

### Recycling Rates in Other Cities

City	Overall Recycling Rate
PORTLAND	58%
SAN FRANCISCO	52%
SEATTLE	42%
NEW YORK	40%
JACKSONVILLE	40%
BALTIMORE	40%
MILWAUKEE	34%
<b>NASHVILLE</b>	<b>31%</b>
SAN DIEGO	30%
MEMPHIS	24%
PHOENIX	23%
AUSTIN	15%
INDIANAPOLIS <sup>4</sup>	11%
SAN ANTONIO	9%
DENVER	7%
HOUSTON	6%
OKLAHOMA CITY	4%

Portland, San Francisco, and Seattle have the highest recycling rate of all the cities that responded to the survey. Portland and San Francisco are alike in that their waste management systems are based on franchising. Portland franchises with many haulers while San Francisco franchises with just one hauler. The cities with the highest overall recycling rate are those that track the private sector recycling. Nearly all of the cities account for recycling from non-residential sources.

The table below shows those cities that have added encouragements to recycling.

Recycling Mandates / Incentives in Other Cities					
	Residential Mandate	Commercial Mandate	Direct Trash Cost	Banned Material	Proposed Ban
PORTLAND	Yes	Yes	Yes		
SAN FRANCISCO			Yes		
SEATTLE	Proposed	Proposed	Yes	Yard Waste	Mixed Paper
NEW YORK	Yes	Yes			
JACKSONVILLE	Yes				
BALTIMORE					
MILWAUKEE	Yes		Yes	Yard Waste	
<b>NASHVILLE</b>					
SAN DIEGO					
MEMPHIS					
PHOENIX			Yes		

<sup>4</sup> These numbers are for Indianapolis and the surrounding county.

AUSTIN	Yes	Yes	Yes
BALTIMORE			
SAN ANTONIO			Yes
DENVER			
HOUSTON			
OKLAHOMA CITY			

The table below shows what the effects of these efforts have been on the pounds of recycled material per person for calendar year 2002. Both Portland and New York, which mandate both residential and commercial recycling, are at the top of the table. Baltimore, Nashville, and Seattle are bunched together in pounds of recycled material per capita. After this group, the numbers fall quickly.

#### Ratio of Recycling Rates to Population in Other Cities

	Population	Recycling Rate	Recyclable Lbs. Per Capita
PORTLAND	529,121	58%	2,422.89
NEW YORK	8,008,278	40%	2,404.44
SAN FRANCISCO	776,733	52%	2,161.54
JACKSONVILLE	778,416	40%	1,300.50
BALTIMORE	651,154	59%	1,039.18
<b>NASHVILLE</b>	<b>570,000</b>	<b>31%</b>	<b>1,036.35</b>
SEATTLE	563,374	42%	953.26
AUSTIN	656,562	17%	351.98
MEMPHIS	681,800	24%	304.08
MILWAUKEE	595,958	34%	202.87
SAN DIEGO	1,200,000	30%	190.11
PHOENIX	1,300,000	23%	180.03
SAN ANTONIO	1,144,646	9%	72.52
DENVER	554,636	7%	59.32
INDIANAPOLIS	1,200,000	11%	57.43
OKLAHOMA CITY	506,132	4%	41.41
HOUSTON	2,000,000	6%	38.00

#### Where Does MSW and C&D go?

There are no disposal points for MSW within Nashville's borders. All of the MSW is transported outside of the jurisdiction. There was 143,479.15 tons of C&D disposed within Nashville's jurisdiction. Southern Services reported receiving 118,472.50 tons and MS-COT Services reported taking in 25,006.65 tons. The remainder, 514,606.85, of the total MSW/C&D stream was transported and disposed of outside of the jurisdiction. Metro's trash is trucked 36 miles from the Allied / BFI transfer station to its active landfill. Metro delivered 180,681 tons to the transfer station. Assuming that each tractor trailer carried twenty-two tons, the total miles driven would have been 591,320.

#### Urban Services District and General Services District

Knowing that a ton of trash came from the Urban Services District (USD) or the General Services District (GSD) is not a certainty. However, one can take the number of dwellings in each district and attribute 43 pounds per house per week of trash and

multiply that by 52 weeks. This would provide a theoretical number of 93,282 MSW residential tons generated in the GSD and 207,402 residential tons generated in the USD.

## ***II. Education Program***

This year the efforts in waste management education have moved beyond the implementation of Nashville's household recycling program to be even more expansive and inclusive to integrating more aspects of the division as a whole. To that end, the recycling coordinators have worked with a set of objectives in mind and developed several goals, strategies and projects each. These objectives and goals, as well as the methods used to achieve each, are outlined below.

### **Objectives**

- Continue public education about the household recycling program.
- Expand the scope of waste management education.
- Further increase outreach efforts to the public.

### **Goals / Strategies**

#### *Continue public education about the household recycling program:*

- Develop strategies that keep the program in the public eye.
- Increase promotion of e-mail / telephone reminder system
- Research areas where recycling participation is lower and develop strategies to increase it.

#### *Expand the scope of waste management education:*

- Expand household program to include businesses, schools, churches, multi-family dwellings and more.
- Expand our recycling/convenience centers to include two new locations; Freightliner Drive at the BFI Transfer Station and Nashville State Community College. A third site is being considered in the Antioch area.
- Increase education about other recycling services such as recycling drop-off sites, composting and our household hazardous waste facility located at the Dr. Richard Adams Drive recycling/convenience center.
- Increase education about cart placement with our automated recycling collection routes.
- Create education strategies for other aspects of the division, such as the mulch facility, brush and leaf collection, bulk collection and dead animal collection.

#### *Further increase public outreach efforts:*

- Expand and develop minority outreach and partnerships.
- Better utilize outreach tools and increase public forums/events.
- Continue to foster and expand community and government partnerships.

## Methods

### *Research*

As with the initial phase of the household recycling program, research continues to be an important element of all of our educational materials. The majority of the research this year has been concentrated on those areas with lower set-out rates and residents who are not participating. This was done primarily through focus groups and attendance at public/neighborhood meetings.

Research	
Activity	Cost
Focus Groups	\$7,000
<b>Total:</b>	<b>\$7,000</b>

### *Advertising*

While advertising was not as extensive this year as it was during the first phase of the household recycling program, there was a substantial advertising component to the education plan. The methods used for such outreach are as follows:

1. Outdoor Advertising (Billboards): This year nine billboards ran from January to June and directly reflected the objectives of continuing the education about the household recycling program, expanding the scope of recycling education, and increasing our minority outreach efforts.
  - In the Urban Service District, six boards reminded residents of what materials go in the recycling cart.
  - There were two boards in the General Service District that direct residents to recycling drop-off sites with the slogan “Almost as Close as Your Curb.”
  - The intersection of Thompson Lane and Nolensville Pike saw its first recycling billboard in Spanish.
2. Radio: This year the radio advertising was reduced and has been concentrated primarily on traffic sponsorships. The spots aired more than 2,300 times between January and June on the Metro Network, WMGC-AM and WHEW-AM. WRLT’s Team Green joined us in promoting Recycle Night with the Nashville Sounds which included seven days of public service announcements and ticket give-aways.
3. Print Advertising: This year a small amount of print advertising was done to promote the Bordeaux Mulch Facility. Coupons were printed offering customers \$1 off of mulch and ran in the *Nashville Scene*, *The City Paper*, and the papers of the GCA Publishing group. In addition, 15 second announcements were aired on WPLN-FM. Over 70 cubic yards of mulch were purchased by residents using the coupons.
4. Partnerships: Many Nashville-area businesses continued to be valuable supporters of recycling in Nashville. The advertising space we received through these partnerships is worth more than \$180,000.
  - a. The Real Yellow Pages from BellSouth



- Half-page recycling advertisement in the Real Yellow Pages
- Hot air balloon ride for winner of drawing at Sounds Game, selected from residents who brought phone books to be recycled
- b. Nashville Sounds
  - Baseball-themed recycling banner in the outfield
  - Baseball-themed recycling banner in the outfield
  - :30-second radio spots played during games on WANT-FM
  - “Recycle Night at the Nashville Sounds” promotion including 5,000 game tickets
- c. Metro Transit Authority
  - Queen-sized advertisements on the exteriors of five buses
  - 10 bus bench advertisements
  - 80 interior bus advertisements (one in every bus)
- d. Nashville Electric Service
  - Advertisements and articles in their monthly newsletter
- e. Purity Dairies
  - Advertisements on half-pint and quart containers

5. Media Relations: Recycling in Nashville continues to receive attention from the media and over the past year has been covered in every major media outlet in the Nashville area.

<i>The Tennessean</i>	WTVF-TV/NewsChannel 5 (CBS)
<i>Nashville Scene</i>	“Talk of the Town”
<i>Nashville Business Journal</i>	NewsChannel 5+/Open Line
<i>The City Paper</i>	NewsChannel 5+/Plus Side
<i>The Westview</i>	WKRN-TV/Channel 2 (ABC)
<i>Green Hills News</i>	Fox 17
<i>News Beacon/News Herald</i>	WSMV-TV/Channel 4 (NBC)
<i>Nashville Parent</i>	WPLN/90.3
<i>Nashville Pride</i>	WLAC/News Radio 1510
<i>Urban Journal</i>	WJXA 92.9
<i>Tennessee Tribune</i>	

6. Printed Materials: Printed materials do not include those created for advertisements, but instead reflect those created for educational and promotional purposes, such as brochures, packets, etc. This past year we have had the following materials printed:

- Holiday Collection Schedule Postcard
- General Services Brochure
- General Services Brochure - Spanish

- Brush Collection Schedule Postcard
- Composting Brochure
- Hispanic Poster

<b>Advertising</b>	
<b>Activity</b>	<b>Cost</b>
Outdoor (billboards)	\$91,000
Radio (traffic sponsorships)	\$59,000
Print (Simply Mulch ads)	\$3,000
Printed Materials (brochures, mailings, etc.)	\$40,000
<b>Total:</b>	<b>\$193,000</b>

### *Outreach*

Outreach continues to be an important aspect of our education program and we strive to include as many groups as possible with our efforts.

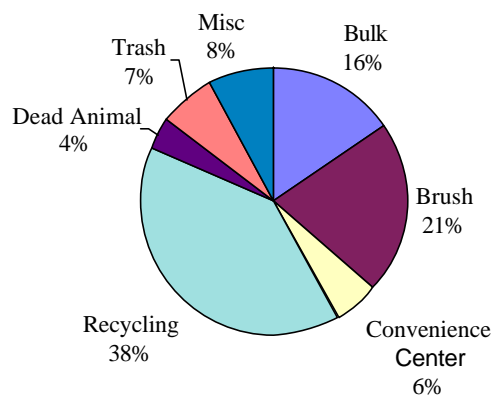
1. Events, Exhibits and Festivals: These have included, but are not limited to:
  - Nashville Earth Day Festival
  - Chamber of Commerce Business Expo
  - Celebration of Cultures
  - Mayor's First Day Festival
  - Lawn and Garden Show
  - Recycle Night with the Nashville Sounds
  - Boys & Girls Club Kids Fair
2. Display Boards and Kiosk: This year a set of display boards was created that contains interchangeable panels and can be used for both presentations and exhibits. The current panels detail the information found in the general brochure. There is a set of these same panels in Spanish as well.

The kiosk has again been used at a variety of events, but most recently has been concentrated on Metro schools where it is used in conjunction with a special event or educational series on the environment and/or waste management. The schools and other venues the where the kiosk has visited include:

- Cumberland Science Museum
- Mayor's First Day Festival
- Hickory Hollow Mall
- 100 Oaks Mall
- State Fair
- Business Expo
- Hillwood High School
- Hickory Hollow Mall

- Harding Mall
  - Goodlettsville Elementary
  - Nashville Public Library
  - Lakeview Elementary
  - Meigs Magnet Middle School
  - Lawn and Garden Show
  - Alex Green Elementary
  - Vanderbilt University
  - Glenview Elementary
  - Bailey Middle School
3. Web Site ([www.nashville.gov/recycle](http://www.nashville.gov/recycle)): Since the Web site launched in April 2002, it has expanded to include more information about other recycling services. Yet another phase of the Web site is planned for the upcoming year that will bring in all of the facilities and services of the Division into one comprehensive site. On average, there are over 5,300 hits per day to [www.nashville.gov/recycle](http://www.nashville.gov/recycle).
4. Call Center (880-1000): Open 12 hours a day, five days a week, the bi-lingual call center receives calls from the public on all Division of Waste Management services. So far this calendar year, the call center has received 64,808 calls averaging over 1,200 calls per week. Below is a graph showing the percent of calls by Division of Waste Management Service.

**Waste Management Service Breakdown**



5. Neighborhood Outreach: Public input and contact continues to be a cornerstone of the education program and that is accomplished primarily through neighborhood associations and community groups. Information is sent regularly to each neighborhood association for inclusion in their association newsletter. In addition, 58 public meetings / presentations have been given to neighborhood and civic groups around Nashville.

The neighborhood outreach also includes working with Nashville's Response Team, comprised of representatives from various departments in Metro Government. The Nashville Response Team has conducted three neighborhood clean-ups this past year: Buena Vista Neighborhood, South Nashville and East Nashville. These clean-ups involve collection of trash and litter, alley clean-ups, bulk pick-ups and other targeted services.

6. **Minority Outreach:** Minority outreach is a key component of the education campaign as the success of curbside recycling relies on all Nashvillians learning about recycling, seeing why it is important and getting involved as an individual, family, business and neighborhood. Some of our activities include:

- Presentation to the Interdenominational Ministerial Fellowship
- Regular interviews on 88.1-FM (Spanish)
- Distribution of posters to Hispanic businesses
- Presence at multiple church and community events within the Hispanic Community, ie. Day of the Dead.
- Sponsorship of the Hispanic Film Festival
- Regular column in The Tennessee Tribune
- Interview on Channel 5's Urban Outlook
- Meeting with North Nashville neighbors in April with a second meeting planned for November

Additionally, the education campaign that the Division of Waste Management has includes working with a local Hispanic marketing firm to assist with reaching out to the over 125,000 Hispanic people living in the Nashville area.

7. **Business Outreach:** With a large portion of any municipality's waste stream coming from business and industry, commercial waste reduction is a priority. This past year, the Division of Waste Management received over 300 requests for assistance on recycling from area businesses. Out of those requests from businesses, 102 waste audits were performed.

For medium and small businesses near a residential curbside recycling route, the division will provide recycling carts. Currently, over 1,200 businesses have begun recycling cardboard, paper, aluminum and tin cans through the curbside program.

<b>Outreach</b>	
<b>Activity</b>	<b>Cost</b>
Community Outreach (events, giveaways, etc.)	\$32,000
Display Materials / Kiosk	\$5,700
Web Site	\$5,000
Minority Outreach (events, printed materials, giveaways, etc.)	\$30,000
<b>Total:</b>	<b>\$62,700</b>

## **Awards**

**2003 Bronze Public Education Excellence Award, Solid Waste Association of North America (SWANA)** – Metro Nashville Public Works Environmental Education (to be presented in October 2003) considered with Seattle and Pierce County, Washington to be the best in the nation.

**2003 Clarion Award, Association of Women Communicators (National)**  
Multi-Media Advertising - Metro Nashville Public Works Recycling Campaign (to be presented in October 2003)

**2003 Silver Anvil Awards, Public Relations Society of America (National)**  
Institutional Programs/Government Programs -  
Metro Nashville Public Works Division of Waste Management's "Curby" Curbside Recycling Campaign

**2003 Best Side Loader Design Contest, Waste Age Magazine**

First Place:

Side Loader Design

**2003 Parthenon Awards, Nashville Chapter, Public Relations Society of America**

First Place:

- Public Relations Campaign - Metro Public Works-Recycling
- Posters, Displays or Exhibits - Metro Public Works-Recycling Kiosk

Second Place:

- Special Purpose Publications Magazine - Metro Public Works - Recycling newspaper insert

**2003: Gold Pen Awards, Nashville Chapter, International Association of Business Communicators (IABC)**

**Gold Pen Award of Excellence:**

- Community Relations/Public Service - Metro Recycling Campaign
- Poster - Metro Recycling Art Contest Poster

**Silver Pen:**

- Newspaper/Tabloid: Four or more colors - Metro Recycling Tabloid
- Billboard: Single - Metro Recycling

**Bronze Pen:**

- Newspaper/Tabloid: Four or More Colors – Metro Recycling Tabloid

### **III. Cost**

#### **Residential Trash**

The largest cost associated with the Division of Waste Management is the collection and disposal of household trash. Metro workers and contractors collect from 130,000 units each week. They perform this collection four days a week. The following table provides a view of all direct costs associated with the operations. The disposal strategy chosen by Metro brought the transfer and disposal cost down. The contractual cost for transfer and disposal for this past fiscal year was \$26.60 per ton.

<b>Trash Collection and Disposal Cost by Fiscal Year</b>			
<b>Residential Trash Collection</b>			
	<b>2001</b>	<b>2002</b>	<b>2003</b>
Collection	\$7,531,693	\$7,914,773	\$7,736,222
Per Weekly Collection	\$1.11	\$1.17	\$1.14
<b>Residential Trash Disposal</b>			
	<b>2001</b>	<b>2002</b>	<b>2003</b>
Disposal	\$14,668,724	\$12,483,998	\$4,613,053
Per Weekly Disposal	\$2.17	\$1.85	\$0.68
<b>Combined Yearly Full Cost Per Customer:</b>	<b>\$178.03</b>	<b>\$163.58</b>	<b>\$99.03</b>

#### **Curbside Recycling**

The roll-out of the Curby collection began in April 2002 and was completed by the beginning of December 2002. Only since that month, has Curby operated all of the routes collecting between 1,000 and 1,200 tons a month bringing the fiscal year total to 12,195 tons. Below is a table showing the direct cost of the program. This includes the service fee for the carts, fuel and parts for the truck, interest on the debt, as well as personnel fees. The material collected by this program generates a \$5 per ton revenue and avoids a \$26.60 per ton disposal fee.

<b>Curbside Recycling Costs</b>	
	<b>FY 2003</b>
Collection	\$1,301,497
Per Weekly Collection Direct Cost	\$0.94
Disposal	\$0.00
Yearly Gross Full Cost Per Customer	\$18.82
<b>Revenue From Sale Of Material</b>	<b>\$60,973.15</b>
<b>Disposal Avoidance Savings</b>	<b>\$324,377.16</b>
<b>Net Full Cost Per Customer</b>	<b>\$15.47</b>

## Commercial Trash

Commercial trash collection includes the dumpster box collection, the six-day a week nighttime collection of down town Nashville, and the six-day a week daytime collection of down town Nashville. By refining the routes of the dumpster collection trucks, Metro has been able to cut the number of daily routes from six to five. As with the private sector, the number of tons collected has gone down thereby driving the cost per ton above last year's level but still significantly below the cost for 2000. The costs below are for collection.

<b>Commercial Trash by Fiscal Year</b>				
	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
Collection Cost	\$947,503.00	\$792,874.00	\$638,368.00	\$662,002.27
Tons	32,626	33,843	34,026	30,573
Cost Per Ton	\$29.04	\$23.43	\$18.76	\$21.65

## Brush Collection

Nashville's collection system has changed little over the past few decades. Nashville has historically used chipper trucks primarily operated by contractors. In the middle of May 2001, the Director of Public Works moved the function of the Brush Collection service over to DWM along with approximately 400 calls a day from citizens complaining that their brush had not been collected. The backlog of material on the streets and the number of complaints was a catalyst for DWM to attempt pilot programs with routes and equipment.

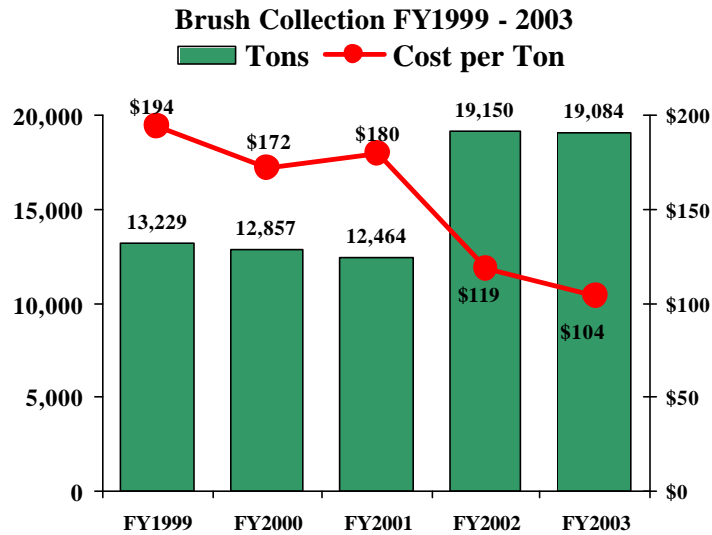
These pilot programs have allowed DWM to compare the efficiency of chippers with trash trucks and grapple/knuckle-boom trucks. The chippers are found to be less productive, very loud, and more dangerous than the other types of collection vehicles.

DWM surveyed the twenty-six largest cities in the country and asked what collection vehicles they used for brush and yard waste collection. The table below shows the responses. Many cities use both trash trucks and knuckles to collect brush and yard waste. Few use chippers.

<b>Brush Collection in Other Cities</b>	
Number Of Cities Responding	14
Cities Using Knuckles/Grapple	8
Cities Using Trash Trucks	11
Cities Using Chippers	2

On July 5, 2001, the DWM initiated a hybrid system of the traditional five rotations along with an appointment system for the collection of brush. The amount of brush collected increased by 54 percent and the cost per ton decreased by 34 percent. DWM purchased a knuckle/grapple truck in the spring of 2002 and another in the summer of that same year. Production efficiency increased and cost decreased. In June 2002, the City Council asked that the appointment system be stopped and Council diminished the submitted budget for

brush collection by \$230,000. Nevertheless, the table below illustrates the continual improvement of the collection system.

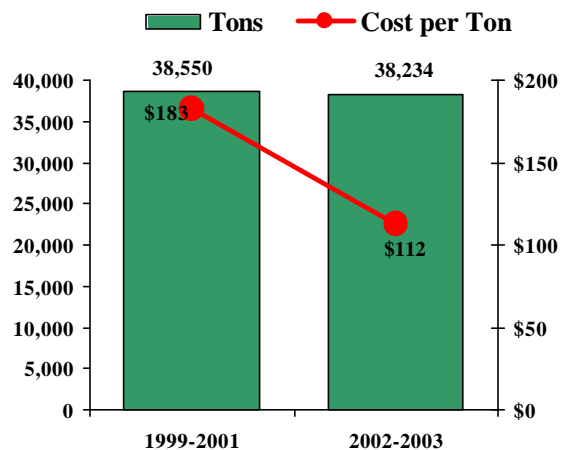


The cost of collection for each of these years was as follows:

Brush Collection Total Costs	
Fiscal Year	Total Spent
1999	\$2,572,466
2000	\$2,219,321
2001	\$2,246,215
2002	\$2,291,846
2003	\$2,002,625

As the next chart illustrates, the drop in cost and the increase in tonnage essentially means that Nashville has collected three years worth of tons for two years of costs.

#### Brush Collection / Cost Comparison





### Household Hazardous Waste Facility

The Household Hazardous Waste (HHW) facility continues to serve more people, take in more tons, and find new ways to recycle material. This past year Metro expanded the days of service to 361. It began to receive electronic equipment and find outlets to recycle. It recycled batteries, oil, anti freeze as well as find outlets for material to reuse instead of dispose. The increase in customers got to the point where DWM hired a hazardous waste technician to work in the facility full-time. He helps the customers unload, packages the material and finds outlets for the material being collected. His cost and the nearly 160 percent increase in tons collected account for the total cost increase.

HHW Operations					
FY	Cost	Days of Operation	Customers	Cost Per Customer	Tons
2000	\$293,000	19	1,584	\$185	101
2001	\$125,000	12	1,776	\$70	110
2002	\$149,000	300	5,287	\$28	148
2003	\$204,390	361	9,930	\$21	397

In a recent survey of the twenty-six largest cities in the country, several provided numbers concerning their HHW programs. The table below shows this information. The cities are listed from largest to smallest populations.

HHW Operations in Other Cities					
	Population	Customers	Cost	Cost Per Customer	Mobile Collection
HOUSTON	2,000,000	4,800	\$360,000	\$75	Yes
SAN DIEGO	1,200,000	7,000	\$1,500,000	\$214	No
SAN FRANCISCO	776,733	14,500	\$1,300,000	\$90	Yes
AUSTIN	656,562	6,429	\$1,000,000	\$156	No
BOSTON	589,141	1,100	\$125,000	\$114	No
<b>NASHVILLE</b>	<b>570,000</b>	<b>9,930</b>	<b>\$204,390</b>	<b>\$21</b>	<b>Pilot</b>

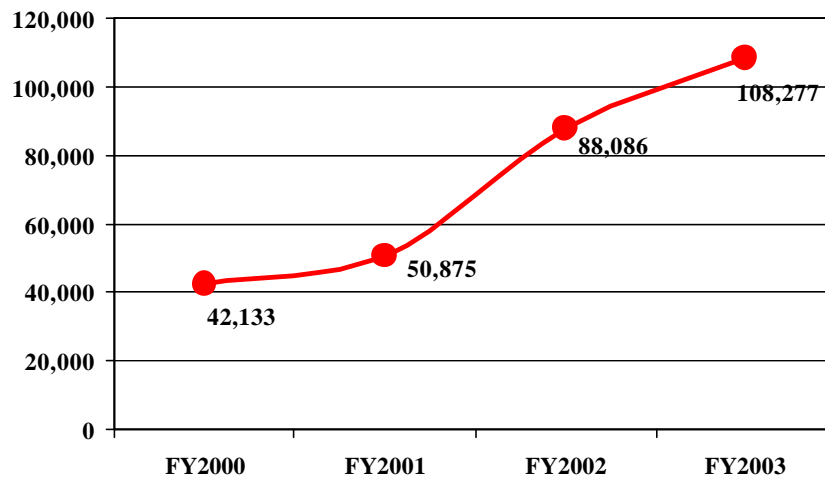
In conjunction with the Mayor's Office of Neighborhoods and the Sheriff's office, DWM took part in a pilot program to provide a mobile collection of HHW in the targeted areas of Woodbine and East Nashville. DWM's portion of the cost for that pilot program is rolled into the cost figure above. The cost per customer, however, does not reflect the estimated 6,000 households served by the mobile collection.

### Recycling Convenience Centers

The Recycling/Convenience Centers are staffed community assets where people can bring such things as their refrigerators to have the Freon safely evacuated and recycled and the metal from the refrigerator recycled or their tires to be recycled. Large bulk items can also be brought as well as household trash to be disposed of in an environmentally friendly manner. The centers' staff encourages people to recycle their plastic, glass, all of their paper, and metal. All of this has encouraged more people to come to these centers.

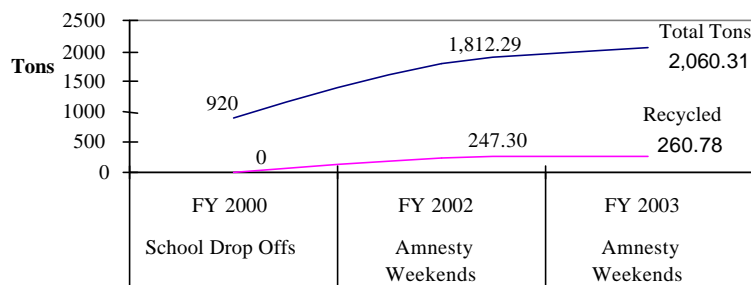
The demand for these centers is growing. DWM is in the process of building a third center off of Freightliner Drive near Lebanon Pike. It is in negotiations with the State of Tennessee to build a fourth at Nashville College and is presently looking for a site in Antioch.

### Customers Using Recycling Convenience Centers



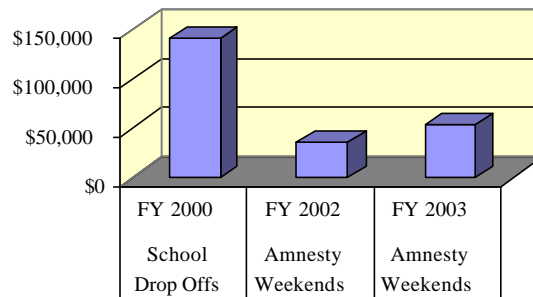
Amnesty Days occur during two months of the year, April and October. During these months, the Recycling Convenience Centers are open for free disposal each weekend. This strategy was used to replace the expensive collections that had occurred on school grounds. The result has been lower cost, greater recycling, and more tons collected in a safer environment.

### Amnesty Collection



The tonnage collected went up from the old and the new systems. Due to the increase in numbers, DWM had more people working those weekends than it did the previous year. This increased the total cost as did the increase in tons disposed. The chart below illustrates the direct cost of the Amnesty Collections.

### Direct Cost Of Amnesty Collections



Construction and demolition debris had been counted separately in previous years. Starting in fiscal year 2003, it was rolled into the budget of the Recycling Convenience Centers. The additional visits by citizens have also meant additional tons. The tons collected increased from 11,444 to 19,070 tons.<sup>5</sup>

### Amnesty Costs per Customer

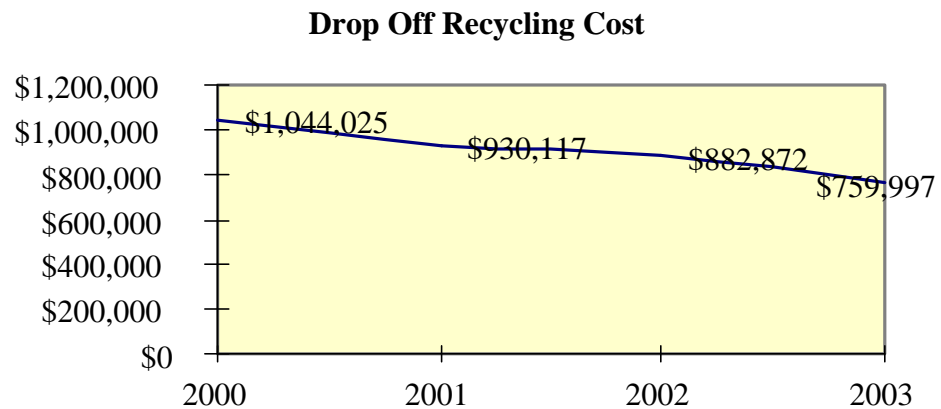
	FY 2000	2001	2002	2003
Cost	\$991,436	\$992,532	\$736,925	\$1,125,812
Customers	42,133	50,875	88,086	108,277
Cost per Customer	\$23.53	\$19.51	\$8.37	\$10.40

### Recycling Drop-Off Sites

The overall cost of the drop-off sites continue to go down but so do the number of these sites. A major problem with un-staffed sites, such as these, is that a few people dump materials other than recyclables at them. They can become unsightly and unwanted by the host of the facility. Several of the Kroger locations have divested themselves of the drop-off sites because of this illegal dumping and, in some cases, for expansion purposes. Those that have **closed** were in Donelson, Inglewood, and Antioch. Several-- Hermitage, Bellevue, and Joelton-- also were **interrupted in service** while DWM found new locations.

<sup>5</sup> In years previous to fiscal year 2003, much of the material taken from the Recycling Convenience Centers did not cross scales. There was an estimated weight based on cubic yards. Starting in fiscal year 2003, all material is weighed. DWM believes the conversion factor from cubic yards to tons was inaccurate in years past.

The cost and tons collected from this program is as follows.



**Recycling Drop-Off Site Tonnage by Fiscal Year**

	2000	2001	2002	2003	
Antioch Comptons	72	248	358	285	<b>Ended</b>
Bellevue	1,184	1,476	1,560	1,429	<i>Interrupted</i>
Clarksville Hwy	156	212	237	209	
Crescent Plaza (Sat)	172	215	251	174	
Donelson	551	641	4	0	<b>Ended</b>
Elysian Fields (Sat)	234	318	360	246	
Granberry (Sat)	330	397	402	314	
Hermitage	666	730	941	870	<i>Interrupted</i>
Hillsboro High	1,622	2,061	2,494	1,851	
Inglewood	589	695	231	0	<b>Ended</b>
Joelton	46	76	104	50	<i>Interrupted</i>
Nashville Tech	860	1,266	1,549	1,270	
Rivergate	150	246	277	208	
<b>Total Tons:</b>	<b>6,632</b>	<b>8,581</b>	<b>8,767</b>	<b>6,907</b>	

**Revenue**

The revenue coming into the solid waste fund comes from several sources. Tip fees at the Metro Bordeaux Mulch Yard, the Recycling-Convenience Centers, and previously at Nashville Thermal Transfer Corporation (NTTC); there is also revenue that comes from the municipal solid waste and construction demolition debris that is generated or disposed within Davidson County. There is interest on Metro's monies and revenue from the sale of material collected such as recyclables. Occasionally, grant monies are provided by entities such as the State of Tennessee.

	<b>FY2000</b>	<b>FY2001</b>	<b>FY2002</b>	<b>FY2003</b>
Tip Fees	\$2,196,564	\$2,890,221	\$2,670,062	\$898,997
Metro Investment Pool	\$355,846	\$400,943	\$336,888	\$103,155
Sales	\$42,038	\$49,264	\$261,062	\$255,717
MSW/C&D Fees	\$2,061,096	\$2,009,699	\$2,558,862	\$2,639,178
Inspection Fees	\$7,050	\$8,553	\$8,800	\$3,650
Other	\$0	\$0	\$202,363	\$85,000
<b>Total</b>	<b>\$4,662,594</b>	<b>\$5,358,680</b>	<b>\$6,038,037</b>	<b>\$3,985,696</b>

#### ***IV. Nashville Transfer Thermal Corporation and the District Energy System<sup>6</sup>***

Nashville Thermal Transfer Corporation (NTTC) was chartered in 1970 and has been providing district heating and/or cooling services to downtown Nashville building owners for almost 30 years as a solid waste-based fired system. Currently, the NTTC system serves 38 buildings within the greater downtown Nashville area including the Coliseum (home of the Tennessee Titans) across the Cumberland River. The decision to modify the DES from a solid waste fired system to a fossil fuel fired system was based in part on the results of a comprehensive study begun in July 2000 to review Metro's waste management system that included NTTC's solid waste incinerator as Metro's primary disposal means.

Metro's participation in NTTC herein is established under an Acquisition and Operating Agreement (A&O Agreement). The A&O Agreement establishes the methodology and guidelines for setting rates for energy and solid waste disposal so that adequate revenue is provided to cover equipment replacement requirements, at least 110% of debt service payments issued to finance NTTC capital improvements, and operational expenses budgeted for the applicable fiscal year. The energy rates established are to consider alternatives that customers, including Metro, would incur otherwise. The payment that Metro is required to make under the A&O Agreement, NTTC termed the Metro Funding Amount, was calculated to allow for the above costs and revenues to balance each year. Each year Metro has made an initial budget for the estimated Metro Funding Amount and supplemented it, as necessary, to meet its financial obligations to NTTC. Because of a supplemental request made by NTTC to Metro in Fiscal Year 1999 or 2000, Metro decided to look into the operations and cost of NTTC relative to other options. Over the years, the Metro Funding Amount has aggregated to approximately \$110 million, and has considerably escalated in the recent 5 years. Each year Metro has appropriated the necessary funding to meet its NTTC obligations.

##### **Development of New System**

In the spring of 2001, Metro issued an RFP seeking private companies to take over the operation, maintenance and management of the district energy system (DES), including the design and construction of a new fossil fuel fired steam and chilled-water generating facility to replace NTTC. After a competitive evaluation of respondents, Constellation Energy Systems (CES) was selected as Metro's developer and operator for the new DES.

The NTTC Board of Directors adopted an interim business plan on April 19, 2001 for the purpose of providing a plan for conducting business through the remaining time the NTTC facilities are in operation. The closing date for the waste-to-energy facility as a whole was originally estimated to be April 2004. Subsequent to the adoption of the interim business plan and the issuance of a consent decree by Metro's Health Department, NTTC agreed to shut down the waste burning components of the waste-to-energy facility by September 30, 2002 and generate steam and chilled water using natural gas fired boilers, instead. A fire in the waste receiving area of the facility occurred on May 23, 2002 and has caused an early closing of waste burning as of the day of the fire.

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<sup>6</sup> This section comes directly from a Bond Feasibility Study written by GBB.

Customers had service interrupted from May 23 through the 25<sup>th</sup>. Currently, the NTTC facility uses only natural gas to supply four boilers (two original/two temporaries) to generate steam.

#### **DES Contractor Guarantee Issues**

During the construction phase of the DES all permits necessary for the construction are in place. The fixed construction cost is within budgets established in the 2002 A Bonds. The construction period performance guarantees are in place per management agreement. There have been no liquidated damages accessed against the contractor.

#### **NTTC's Service Interruption**

In fiscal year 2003 only one outage occurred. This was a scheduled cold plant storage outage on November 10 – 11, 2002.

#### **Transition of NTTC Workforce**

Seven of the former NTTC workers have joined Metro. Sixteen of the NTTC workers chose the severance package.

#### **OSHA Accidents**

NTTC has reported one accident that occurred during the baghouse demolition when a worker cut his finger. DES construction has had no reportable accidents.

DES has reported injuries as listed:

1. Neck Strain Injury (9/3/03)
2. Foreign Object In Eye Injury While Welding (9/9)
3. Foot Puncture (Missed Work) (9/12)
4. Back Strain Injury (9/15)
5. Back Strain Injury (Lifting Latter) (9/19)
6. Leg Muscle (Missed Work) (9/24)

#### **Contract Violations by NTTC or DES**

There have been no contract violations on the part of either entity.

#### **DES Construction Status**

As of June 30, 2003, the base construction in the amount of \$43,613,321 was 72.24 percent completed. Change orders for work in the amount of \$4,479,554 was 49.76 percent completed.

#### **NTTC FY 2003 Heating and Cooling Costs**

	<b>Steam</b>	<b>Chilled Water</b>	<b>Total</b>
Metro	\$1,533,238	\$2,362,648	\$3,895,886
State	\$2,718,966	\$3,197,796	\$5,916,762
Private	\$1,313,616	\$2,795,930	\$4,109,546
<b>Total</b>	<b>\$5,565,820</b>	<b>\$8,356,374</b>	<b>\$13,922,194</b>

**Historical NTTC Energy Distribution System Costs**

<b>FY</b>	<b>Capital Projects</b>	<b>EOM</b>	<b>Total</b>
2003	\$586,240	\$166,105	\$752,345
2002	\$295,053	\$103,597	\$398,650
2001	\$41,000	\$127,662	\$168,662
2000	\$1,086,924	\$88,905	\$1,175,829

**Full Cost Of NTTC by Fiscal Year**

	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
Total Gross Costs	\$10,679,802	\$15,094,765	\$20,080,342	\$9,163,802



## ***V. Contract Compliance***

Metro's contracted collectors of trash were in compliance with the contract. The contractor for disposal was also in compliance. Metro's contractor for brush collection was docked nineteen hours in chargeable fee for such things as mechanical breakdowns. The contractor for disposal was also in compliance. NTTC and CES were also in compliance. There is no longer any ash contractor.

### **Minority/Women Participation**

BFI reported a racial diversity of 70 percent African American, 28 percent Caucasian and 2 percent Hispanic. It reported a gender diversity of 94 percent male and 6 percent female.

Crick Disposal reported a racial diversity of 16 percent African American, 84 percent Caucasian. It reported a gender diversity of 100 percent male.

Hudgins Disposal reported a racial diversity of 70 percent African American, 30 percent Caucasian. It reported a gender diversity of 100 percent male.

Jordan Disposal reported a racial diversity of 100 percent Caucasian. It reported a gender diversity of 83 percent male and 17 percent female.

McMurtry Disposal reported a racial diversity of 100 percent Caucasian. It reported a gender diversity of 66 percent male and 33 percent female.

PDQ Disposal reported a racial diversity of 86 percent African American and 14 percent Caucasian. It reported a gender diversity of 100 percent male.

Spurlock Disposal reported a racial diversity of 40 percent African American and 60 percent Caucasian. It reported a gender diversity of 100 percent male.

Queen's Tree Surgery reported a racial diversity of 62 percent African American and 38 percent Caucasian. It reported a gender diversity of 100 percent male.

### **Environmental Compliance**

BFI's Transfer Station had one Notice of Violation during construction due to excessive grading. It had a seven V1 for unsatisfactory access road/parking area, unapproved discharge of liquid residue, waste handling conducted on unpaved surface, and unsatisfactory litter control.

BFI's Middlepoint Landfill had a Notice of Violation on August 7, 2002 from the Division of Air Pollution Control for temperature and flow chart recorders not operating. It also had three V1 for unsatisfactory litter control, initial cover, and washout of solid waste.

**METRO PUBLIC HEALTH DEPARTMENT**  
Sources of Air Pollution in Davidson County

**ENVIRONMENTAL HEALTH SERVICES**

Presented by  
Brent Hager, PhD, PE  
October, 2003

**NASHVILLE'S AIR QUALITY CONTROL PROGRAM**

- ❖ About our program
- ❖ What are the major contributors to air pollution in Nashville?
- ❖ Where do we stand based on Federal air quality standards?



**AIR QUALITY CONTROL DIVISION**  
Major Activities

- Engineering
- Permit Program
- Field Enforcement
- Ambient Air Monitoring
- Indoor Air Quality
- Asbestos
- Vehicle Inspection Program

**WHERE DOES MOST OF NASHVILLE'S AIR POLLUTION COME FROM?**

- ❖ Dust from paved roads accounts for 85% of the  $PM_{10}$  emissions
- ❖ Fuel combustion accounts for 73% of the total sulfur dioxide emissions
- ❖ On-road and non-road mobile source emissions account for 82% of the total nitrogen oxide emissions
- ❖ On-road and non-road mobile source emissions account for 95% of the carbon monoxide emissions
- ❖ On-road and non-road mobile sources account for 59% of the total volatile organic compound emissions
- ❖ 14% of the total volatile organic compound emissions is contributed by other solvent usage including degreasing, graphic arts, and consumer/commercial solvents

**MOBILE SOURCES**

- ❖ Mobile sources include both on-road and off-road sources.
- ❖ This source category includes cars, trucks, buses, airplanes, trains, lawn equipment and boats
- ❖ The criteria air pollutants emitted from mobile sources account for about 75% of the total amount of criteria pollutants emitted by all air pollution sources in Nashville



**MOBILE SOURCES (cont.)**



- ❖ This source category is generally the largest contributor to air pollution in middle and large size cities
- ❖ A key strategy for managing air quality in cities is to minimize the emissions from the mobile source category
- ❖ You can help by keeping your car tuned up, carpooling, walking or biking as much as possible and promoting and using mass transit



## 8-HOUR OZONE STANDARD

- o The revised 8-hour ozone standard will be more stringent than the current 1-hour standard
- o Fuel combustion sources (boilers), motor vehicles (on and off-road), fuel marketing and other solvent use are the major contributors to ozone formation
- o Meteorology plays a significant role in the formation of ozone
- o The old standard was 0.12 ppm averaged over 1 hour
- o The revised standard is 0.08 ppm averaged over 8 hours
- o Nashville is currently in compliance with the 1-hour standard and the more stringent 8-hour standard
- o However, due to ozone monitors in counties outside of Davidson County, but in the Nashville MSA, the Nashville MSA is not meeting the more stringent 8-hour standard

## FUEL COMBUSTION AND SOLID WASTE DISPOSAL



- o Fuel combustion includes burning natural gas, fuel oil, wood and coal
- o Solid waste disposal includes incinerators, burning and vehicle fires and sewage treatment
- o The criteria air pollutants emitted from these sources account for only about 6% of the total amount of criteria air pollutants emitted by all air pollution sources in Nashville
- o When it was still burning municipal solid waste, NTTC shown at left, sometimes produced lots of heated conversation!!

## NTTC IMPROVEMENTS

POLLUTANT	NTTC W/MWC	NTTC TODAY	METRO DES	CHANGE FROM NTTC W/MWC TO METRO DES
Particulate matter	160.7	69.4	10.9	-93.2%
Sulfur dioxide	315.5	29.2	1.6	-99.5%
Nitrogen oxides	658.0	164.2	80.3	-87.1%
Carbon monoxide	267.3	174.1	120.2	-55.9%
VOC	28.2	11.4	7.5	-72.9%
Lead	1.5	0	0	-100%
Hydrogen chloride	68.5	0	0	-100%
Hydrogen fluoride	10.6	0	0	-100%
Dioxin/Furans	0.0091	0	0	-100%
Arsenic	0.033	0	0	-100%
Cadmium	0.14	0	0	-100%
Chromium	0.022	0	0	-100%
Mercury	0.27	0	0	-100%
Nickel	0.022	0	0	-100%
Chlorine	0.1	0.03	0.1	+9100%

<sup>1</sup> Increase due to change from river water to city water for cooling towers

## WHAT ARE WE DOING?

- o Continuing implementation of the vehicle inspection program and enforcement of existing regulations
- o Participating in Arkansas Tennessee Mississippi Ozone Study (ATMOS)
- o Participating in the Nashville Early Action Compact (EAC) with TDEC, TDOT other Nashville MSA counties
- o Participating in a daily Nashville MSA air quality forecast
- o Developing an Air Quality Action Day Program
- o Preparing our portion of the EAC to bring Davidson County and the Nashville MSA into attainment with the pending 8-hour ozone standard
- o At the same time, TDEC is investigating the types of emission reduction measures that should be adopted on a state wide basis such as a state wide, or EAC wide vehicle inspection maintenance program

## ATMOS STUDY

- o Arkansas, Tennessee and Mississippi Ozone Study
- o Includes the state/local air quality programs, EPA, MPO's, FHWA, TVA and other industry partners
- o This is a group that has been working together since 1999 to form a plan to reduce ozone in these areas.
- o A plan should be finalized in the next few months.

## NASHVILLE EAC

- o Tennessee's Early Action Compacts (EACs) are voluntary agreements to meet clean air standards quicker
- o These agreements are between the state, EPA, and the local elected officials of those counties and cities in the state that could be designated as 8 hour ozone non-attainment areas by EPA on April 15, 2004
- o The EACs provide a voluntary mechanism to meet the ozone standard by 2007 - cleaner air faster.
- o As an inducement for the state to develop a plan to attain the ozone standard on an accelerated schedule, EPA will defer the non-attainment designations that will be made for traditional ozone non-attainment areas on April 15, 2004

## EAC REGIONS IN TENNESSEE



## UPCOMING FEDERAL REGULATIONS THAT WILL HELP

- 2007 - 2010 - Heavy Duty Diesel Vehicle (HDDV) standard.
- 2006 - 2009 - Ultra Low Sulfur Diesel (ULSD) fuel standard.
- 2004 - 2009 - Tier2 gasoline vehicle emission standards to include all vehicles  $\leq 10,000$  # GVWR.
- 2004 - 2007 - Low sulfur gasoline standard.
- Proposed standards for non-road gasoline and diesel engines.

## SUMMARY

- We have come a long way, and Nashville is in attainment with the old 1-hour ozone standard.
- We have a lot of work to do to help bring the Nashville MSA into attainment with the pending 8-hour ozone standard which is much more stringent than the existing 1-hour standard.
- We have a very tight schedule to meet in order to remain in the EAC.
- We are committed to do our part to bring the Nashville MSA into attainment with the 8-hour ozone standard as expeditiously as possible.
- The new  $PM_{2.5}$  standard will be a challenge.
- As with the 8-hour ozone standard, we are committed to maintain or attain the  $PM_{2.5}$  standard.

## AIR QUALITY CONTROL DIVISION

Useful Telephone Numbers and Websites

Metro Health Department  
<http://healthweb.nashville.org/psipoll.html>  
 (615) 340-0488 (AQI, Air Quality Forecast & Pollen recording)

Air Quality Control Division  
 (615) 340-5653

